VOLUME - 9, ISSUE - 8, August - 2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper | Medical Science

UTILITY OF RISK OF MALIGNANCY INDEX IN THE PREOPERATIVE ASSESSMENT OF CYSTIC OVARIAN LESIONS: STUDY FROM A TERTIARY CARE CENTER

Resmi P Nair	Tutor, Sree Gokulam Medical College and Research Foundation, Venjaramoodu, Thiruvananthapuram.
Kalaranjini KV	Professor, Sree Gokulam Medical College and Research Foundation, Venjaramoodu, Thiruvananthapuram.
Jinu Abraham Glaxon*	Associate Professor, Sree Gokulam Medical College and Research Foundation, Venjaramoodu, Thiruvananthapuram. *Corresponding Author
Sheela Vasudevan	Professor, Sree Gokulam Medical College and Research Foundation, Venjaramoodu, Thiruvananthapuram.

ABSTRACT

Background: Preoperative diagnosis of whether an adnexal mass is benign or malignant cannot always be made with current diagnostic modalities. Risk of malignancy index (RMI) is a simple scoring system based on menopausal status, ultrasound, and serum concentrations of CA-125.

Objectives: To evaluate RMI and predict its diagnostic characteristics with histopathology which is the gold standard of diagnosis in non neoplastic and neoplastic cystic ovarian lesions.

Methods: Prospective study of one year in which 89 clinically diagnosed cases of ovarian cystic lesions who have underwent surgical intervention were studied, along with ultrasound score, menstrual status and serum CA 125 levels.

Results: Majority of cases (n=32, 36%) occurred in the age interval of 40-49 years. Mean age is 44+/- 12 years. The proportion of malignant to benign masses seen in the postmenopausal group was higher than that of the premenopausal group. USG Score sensitivity is 53.33%, specificity 85.14%, PPV 42.11%, NPV 90 % and accuracy 79.78%. For CA-125, sensitivity is 60%, specificity 78.38%, PPV 36%, NPV 90.63% and accuracy 75.28%. In case of menstrual score, sensitivity is 53.33%, specificity 77.03%, PPV 32%, NPV 89% and accuracy 73.03%. Sensitivity, specificity, PPV, NPV and accuracy obtained for RMI >150 were 60%, 87.84%, 50%, 91.55% and 83.15% which was higher than individual factors.

Conclusion: RMI has a potential role in the selection of cases for conservative management or minimal invasive surgery for benign masses. RMI can be used by the gynecologists for referral of suspected ovarian tumors to gynec-oncology centers for primary cytoreductive surgery which is the most important factor for survival of the patient.

KEYWORDS : Risk of Malignancy index, CA 125, ovarian cancer, menopausal score, ultrasound score

INTRODUCTION

Of all gynecological malignancies, ovarian cancer has the worst prognosis since it is usually diagnosed at an advanced stage, hence known as silent killer.[1] Clinical, radiological and gross examination alone cannot distinguish benign from malignant lesions, and histopathological examination is gold standard for diagnostic, therapeutic and prognostic approach.[2] Several diagnostic methods for ovarian mass have been reported but none of these methods, used individually, has shown significant performance in detecting malignant ovarian tumors. This led to the development of a mathematical formula using a combination of these diagnostic modalities. RMI was originally developed by Jacobs et al in 1990[3], termed RMI 1. This index was defined as the product of menopausal score (M), ultrasound score (U), and the absolute value of serum CA 125 level and reported a sensitivity of 85.4% and specificity of 96.9% at the cutoff value of 200[4] Second version of RMI was developed in 1996 by Tingulstad et al,[3] termed RMI 2, which gave a sensitivity of 80%, specificity of 92% and PPV of 83%. The RMI 2 was modified by same authors in 1999, known as RMI 3.[5] Subsequently, RMI 4 was presented by Yamamoto et al with tumor size as an additional parameter.[6]

The objective of this study is to evaluate RMI and predict the diagnostic characteristics of RMI with histopathology as the gold standard in diagnosis of neoplastic and non neoplastic ovarian cystic lesions.

MATERIALS AND METHODS

A prospective study conducted in a tertiary care center over one year from November 2018 to 2019. Eighty-nine patients with clinically diagnosed ovarian cystic lesions and who have underwent surgical intervention were selected for the study. Exclusion criteria included; subjects with functional cysts less than 5 cm, subjects with evident signs of hepatic, peritoneal or lung metastasis, patients with adnexal mass other than ovarian cyst, patients with solid tumours and malignant solid lesions undergoing cystic degeneration. Brief clinical, menstrual and obstetric history obtained. Ultrasound findings and serum CA 125 levels noted and RMI calculated. Staging laparotomy done and specimens received in 10% formalin. Grossing done and representative tissues taken, processed, embedded in paraffin blocks, then sectioned, stained and histopathologically studied to arrive at a final diagnosis. RMI was compared with histopathological diagnosis and data analyzed using Statistical Package for Social Sciences version 10 (SPSS Inc., Chicago, IL, USA). The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy of menopausal score, ultrasound score, and absolute value of serum CA-125 levels were calculated separately and combined into the RMI.

RESULTS

Histopathological diagnosis of 89 ovarian cystic masses are given in Table 1.

Table 1: Histopathological Diagnosis Of Ovarian Lesions

Non neoplastic Ovarian Tumors	Incidence (n) and percentage %
Endometriotic cyst	8 (9%)
Siderophagic cyst	2 (2.2%)
Haemorrhagic cyst	1 (1.1%)
Neoplastic Ovarian Tumors	
Benign	
Serous Cystadenoma	36 (40.4%)
Mucinous Cystadenoma	16 (18%)

Seromucinous cystadenoma	1 (1.1%)
Mature Cystic Teratoma	9 (10.1%)
Collision Tumor (Thecofibroma with Serous Cystadenoma)	1 (1.1%)
Borderline	
Borderline Serous Cystic Neoplasm	3 (3.4%)
Borderline Mucinous Cystic Neoplasm	3 (3.4%)
Malignant	
Borderline Mucinous cyst with focus of Intraepithelial carcinoma	1 (1.1%)
Serous Cystadenocarcinoma	1 (1.1%)
Mucinous Cystadenocarcinoma	3 (3.4%)
Endometrioid Carcinoma	1 (1.1%)
High Grade Serous Carcinoma /Endometrioid Carcinoma	1 (1.1%)
High Grade Serous Carcinoma /Transitional Carcinoma	2 (2.2%)

Age of patients ranged from 16 to 89 years. Largest group was in the third and fourth decade, and here benign lesions constituted the majority. The proportion of malignant cases increased as age advanced and mean age for malignant lesions was 50 years. Twenty five cases (28.1%) were postmenopausal and 64 cases (71.9%) were premenopausal. The proportion of malignant to benign masses seen in the postmenopausal group was higher than that of the premenopausal group.

The comparison of menopausal score, ultrasound score, serum CA 125 levels and RMI Score > 150 and histopathological diagnosis is given in Table 2.

Table 2: Menopausal score, ultrasound score, serum CA-125 levels, and risk of malignancy index in the study population

	Histopathology (%)		Total (%)
	Benign	Malignant	
Menopausal score			
Score 1	57 (77.02%)	7(46.66%)	64 (71.91%)
Score 3	17 (22.9%)	8 (53.33%)	25 (28.10 %)
Ultrasound score			
Score 1	63 (85.13%)	7(46.66%)	70 (78.65%)
Score 3	11 (14.86%)	8 (53.33%)	19 (21.34%)
Serum CA - 125			
Serum Ca 125 < 35	58 (78.37%)	6 (40%)	64 (71.91%)
Serum Ca 125 > 35	16 (21.62%)	9 (60%)	25 (28.10%)
RMI			
RMI < 150	65 (87.83%)	6 (40%)	71 (79.77%)
RMI > 150	9 (50%)	9 (50%)	18 (20.22%)

Sensitivity, specificity, PPV, NPV and accuracy obtained for ultrasound score, menstrual score, serum CA 125 and RMI >150 are given in Table 3.

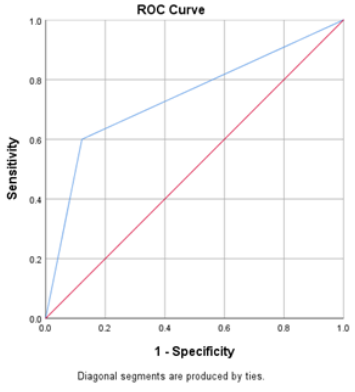

Figure 1: Receiver operator characteristic curve for risk of malignancy index

Table 3: Comparison between USG Score, Menstrual Score, Serum Ca-125 and RMI 150

	Sensitivity	Specificity	PPV	NPV	Accuracy
USG SCORE	53.33%	85.14%	42.11%	90 %	79.78%
MENSTRUAL SCORE	53.33%	77.03%	32%	89%	73.03%
CA-125	60%	78.38%	36%	90.63%	75.28%
RMI 150	60%	87.84%	50%	91.55%	83.15%

Receiver operator characteristic (ROC) curve for RMI 150 is given in Figure 1 with area under the curve being 0.739.

DISCUSSION

Selective referral of patients with high risk of malignancy to specialized oncology centres is of great importance as primary cytoreductive surgery has a major role in deciding the prognosis of the patient.[7,8] In this study, we report the multiparametric RMI score to be a useful tool in prediction of malignant ovarian disease in low-resource settings. One of the factors which predict the stage and survival of patients with malignant ovarian tumors is age of the patient. It is described as an independent prognostic factor in ovarian tumors[9] In our study majority of cases (n=32, 36%) occurred in the age interval of 40-49 years followed by 30-39 years (n=19, 21.3%). Majority of the ovarian tumors (64 cases) were in pre menopausal age group and rest of the cases (25 cases) were in post menopausal age group. Out of the 25 postmenopausal cases, 8 cases were malignant (ie, 53.33%) which is high compared to malignant cases in premenopausal age group ie, 7 cases out of 64 (46.66%). This is comparable with the studies conducted by Thakare. S et al,[7] Jung Woo Park et al.[9] and Veluswamy Arun Muthuvel et al.[10]

Different versions of RMI have been validated retrospectively and prospectively in different clinical studies [3-10] In our study, we used RMI 3.[4,5] It accurately predicted (n=9, 60%) malignant ovarian tumors while it was falsely elevated in 9 of the benign cases which included 2 cases each of serous and mucinous cystadenomas, 4 cases of endometriotic cyst and one case of a collision tumor (thecafibroma with serous cyst). Among the 6 malignant cases with low RMI, two case each were borderline serous and mucinous cystic neoplasms followed by one case each of mucinous cystadenocarcinoma and high grade serous carcinoma. This can be accounted to the fact that RMI was of less accuracy in diagnosing borderline neoplasms.

In our study, CA 125 was the best parameter out of all three parameters with a sensitivity and specificity of 60% and 78.38% followed by USG and menopausal status. This is comparable to studies done by Torres et al.[11] in which 158 cases was studied using an RMI 1 cut-off of 150. Another study done by Ulusoy et al.[12] which using cutoff value of 153 for RMI showed a sensitivity, specificity, positive and negative predictive value of 76.4%, 77.9%, 65.9% and 85.5% and a correct diagnosis rate of 79.4%.

CONCLUSION

RMI scoring in our setting is an easy, highly reliable and applicable method which can be utilised in the preoperative evaluation of ovarian masses. Present study has shown that the RMI, with cutoff value of 150 is a better tool for differentiating benign and malignant ovarian tumors than CA 125, USG and Menstrual score alone.

REFERENCES:

[1] Menon U, Talaat A, Rosenthal AN, Macdonald ND, Jeyerajah AR, Skates SJ, et al. Performance of ultrasound as a second line test to serum CA125 in ovarian cancer screening. BJOG 2000;107:165-9.
[2] Dhakal R et al Clinicomorphological Spectrum of Ovarian Cystic Lesions;

Kathmandu Univ K Med J. 2016 Jan-Mar;14(53):13-6.
[3] Jacobs I, Oram D, Fairbanks J, Turner J, Frost C, Grudzinskas JG. A risk of malignancy index incorporating CA-125, ultrasound and menopausal status for the accurate preoperative diagnosis of ovarian cancer. Br J Obstet Gynaecol 1990;97:922-9.
[4] Tingulstad S, Hagen B, Skjeldestad FE, Onsrud M, Kiserud T, et al. (1996) Evaluation of a risk of malignancy index based on serum CA125, ultrasound findings and menopausal status in the pre-operative diagnosis of pelvic masses. Br J Obstet Gynaecol 103: 826-831.
[5] Tingulstad S, Hagen B, Skjeldestad FE, Halvorsen T, Nustad K, et al. (1999) The risk-of-malignancy index to evaluate potential ovarian cancers in local hospitals. Obstet Gynecol 93: 448-452.
[6] Yamamoto Y, Yamada R, Oguri H, Maeda N, Fukaya T. Comparison of four malignancy risk indices in the preoperative evaluation of patients with pelvic masses. Eur J Obstet Gynecol Reprod Biol 2009;144:163.
[7] Thakare S, Dube A, Wankhede S. Risk of malignancy index 2 in preoperative evaluation of ovarian masses and its correlation with histopathology. J. Evolution Med. Dent. Sci. 2016;5(9):376-80.
[8] Zaman S, Majid S, Hussain M, Chughtai O, Mahboob J, Chughtai S. A retrospective study of ovarian tumours and tumour-like lesions. Journal of Ayub Medical College Abbottabad. 2010 ;22(1):104-08
[9] Jung-Woo P, Jee-Hyun P, Song ES, et al. Four risk of malignancy indices in evaluation of pelvic masses. Korean J Obstet Gynecol 2012;55(9):636-43.
[10] Muthuvel VA and Jaya V. Preoperative evaluation of ovarian tumors by risk of malignancy index, CA-125 and Ultrasound. Asian Pac J Cancer Prev 2014;15(6):2929-32.
[11] Torres JC, Derchain SF, Faundes A, Gontijo RC, Martinez EZ, et al. (2002) Risk-of-malignancy index in preoperative evaluation of clinically restricted ovarian cancer. Sao Paulo Med J 120: 72-6.
[12] Ulusoy S, Akbayir O, Numanoglu C, Ulusoy N, Odabas E, et al. (2007) The risk of malignancy index in discrimination of adnexal masses. Int J Gynaecol Obstet 96: 186-91.